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## ABSTRACT

An arts-based supplemental education program was evaluated qualitatively and quantitatively. It was hypothesized that this classroom program would cause gains in critical thinking skills, as measured through writing ability. The program provided 87 teachers in grades 3 through 12 with a classroom set of "Arts Indiana" magazine and an accompanying study guide. The qualitative study of teacher use of the resources and materials of the program identified teachers who were using the program effectively. About half of the program teachers agreed to participate in the quantitative part of the study, designed to evaluate students' critical thinking and writing skills. This study was completed in the context of a new state high school achievement test of writing. About 2,000 pretests were obtained after summer vacation before students participated in the supplemental program and about 1,700 posttests of student writing were also completed. Classwide losses in critical thinking skills were actually seen from pretest to posttest. Although the supplemental resource did not cause greater gains in critical thinking among its users, its effective use did reduce the classwide losses in students' critical thinking and writing experienced between the pretest and the posttest. Implications for teaching in general and for this program in particular are discussed. (Contains seven graphs.) (SLD)

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ED 428 093

**EVALUATING SUPPLEMENTAL PROGRAM IMPLEMENTATION  
THROUGH MEASUREMENTS OF STUDENTS' CRITICAL THINKING  
SKILLS AND WRITING ABILITY**

**A Paper Presented at the 1998 Annual Meeting  
of the Mid-Western Educational Research Association  
October, 1998**

by

**Dr. David W. Moffett**

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## The Study

This two-year study was designed to have a qualitative component and a quantitative component. During the first year of the study, in the 1995-1996 school year, I traveled 8,000 miles through 68 Indiana counties to visit, interview, and observe 87 teachers who were in a classroom program called *Arts Indiana Magazine in the Classroom*.

The supplemental program provided program teachers with a classroom set of *Arts Indiana* magazines and an accompanying *Arts Now!!!* study guide. The program began five years earlier with four teachers and had grown to 87 teachers receiving approximately 3,000 magazines, monthly, by the time of this study.

Teachers in grades third through twelfth used the supplemental resource especially in subjects like visual arts, language arts, humanities, and the performing arts. The program was designed to increase student performance on standardized achievement tests by inciting enhanced critical thinking skills, through the visual, performing, and literary arts.

I interviewed all program teachers and transcribed taped sessions to help me determine who seemed to be using the resource most effectively. This led to my dividing the program teachers into two groups of teachers for the subsequent quantitative portion in year two of the study ('96-'97). One group consisted of teachers who used the resource most effectively and the second group of program teachers were those who were judged to be using the resource less effectively.

About half of the 87 program teachers agreed to participate in the quantitative portion of the study. The critical path of the quantitative portion of the study soon became the assemblage of control groups for the study. Two control groups were designed. One group consisted of teachers who were interested in eventually receiving the free supplemental resource beyond the life of the study and a second control group would consist of teachers who were simply interested in having students participate in a writing study that measured their students' critical thinking skills.

At this same time, the Indiana Department of Education announced that the next high school achievement test would include a writing portion on the test that would resemble the writing exercise in the study. The validated writing instrument for the study was an NAEP instrument used in a 1992 national writing study. The particular instrument measured critical thinking skills through asking students to write about an invention. Students were asked to draft a letter to the United States patent office describing some sort of an invention.

As a result, the State's sixth largest school district decided to have all tenth grade students participate in the study, along with teachers across grades fifth through twelfth; across subjects, from all parts of Indiana. Treatment and control groups were built and organized and I then began to deal with the new testing and privacy laws that had been established by the Indiana legislature. The parents or guardians of all students who might be in the study had to consent to their child being in the

study. With the new laws, no scholarly research will feel the enjoyment of having all students participate in a study. While many students' parents and guardians did sign consent papers to allow their children to be in the study, some did not. I believe these new laws that are supposed to protect the privacy of Indiana students actually harm educational research by excluding some students from studies like this.

Pretest packets were sent to the 90 treatment and control group teachers with approximately 2,050 tests and 4,200 consent forms included. All packets had to be hand stamped because of the TWA airline crash and heightened security at the post office. Teachers were carefully prompted to give the writing tests as early as possible in the semester. They would give a posttest with the same NAEP prompt as late as possible in the semester.

About 2,000 pretests were returned and scored using the rubric provided by the NAEP. Compensated interraters randomly pulled and audited ten-percent of all tests and the reliability rate of both the pretests and posttests were consistent and above the rates of the 1992 NAEP national study.

Posttest packets were prepared and delivered prior to the end of the semester. About 1700 posttests were completed and returned. They were scored and interratered in the same fashion as the pretests.

Using an SPSS software package, I was able to enter data on my microcomputer at my home office. This advance in technology saved me a considerable amount of

time. Upon completion of all data entry, I had the privilege of having Dr. Kim Metcalf help me run the data at the Smith Research Center at Indiana University. I had hypothesized that the supplemental classroom resource would cause greater gains in critical thinking skills, as measured through students' writing abilities, than in groups who either used the resource less effectively or didn't use the resource at all. The qualitative and quantitative results of the study were surprising and very interesting.

### **The Results**

The first year's qualitative portion of the study yielded many interesting results that would have not been revealed had the study only measured the effects of the supplemental program quantitatively.

The most important qualitative discovery for me was the use of the arts magazine by rural, and impoverished, students as a model of possibilities for themselves. Students in poor, remote areas were encouraged to go to technical or trade school beyond high school to secure a position that would allow them to secure a livelihood in their hometowns. The magazine offered models of possible alternatives to mundane employment. It was reported to me that some students took the risks of becoming artists after reading about other Indiana people who had successfully become artists despite economic realities and demands.

Other students found that the art, writing, and poetry in the magazine served as models for them in their art and writing production. Students were

able to synthesize the products of the magazine into artistic efforts.

Students who produced written journals, across subjects, often mentioned articles or art seen in the supplemental classroom resource.

Since there were no requirements of use for the sponsored classroom resource there was a broad range of effective use of the resource. The usage varied from my finding boxes of unopened magazines in a school mail room and on a loading dock to the resource being valued and used as a primary classroom resource tool. I concluded that the magazine to student ratio was about one to two and one-half or three. In other words, about 7,000 to 9,000 Indiana students were using the classroom resource in some manner each month.

I was asked to co-author the study guide that accompanied the monthly magazine during the two year study. I found that the Program Manager of the classroom program had little experience in writing questions that would spawn higher level, and critical, thinking and that he had no experience with Fry Graphs for reading level analyses. This resulted in a monthly struggle of pulling the questions down from haughty levels to appropriate grade level reading levels and manipulating the questions to resemble the high end of Bloom's hierarchy. There was always a struggle to align the study guide with the intended purpose of the classroom resource. There was also ongoing dialogue about appropriate content for the school audience since the same publication was also sold on

newsstands and through the magazine's circulation department. Occasionally, profanity would find its way into the magazine and I expressed concerns about such inclusions because my qualitative research led to discoveries of teachers ending up on Principal's carpets for profanity and nudity being included in the magazine. Time-pinched program teachers seldom had time to inspect the magazine cover-to-cover searching for inappropriate content but students took the time to find it and share it with their parents who, in turn, shared it with building Principals.

The year-long quest of discovering the usage's of the resource allowed me to carefully group teachers into treatment groups for the quantitative portion of the study. In the quantitative portion, my observations made during the qualitative portion of the study were confirmed and reinforced. In my travels, I witnessed many teachers focusing on the basics in education. Art teachers, for the most part, concentrated on studio production. The more effective ones had adopted a teaching technique called Discipline Based Art Education (DBAE). They incorporated art history, art criticism, and writing in art. Only a few teachers in other subject areas had shifted teaching strategies to include active student learning and few instructors encouraged creative and critical thinking. Most classes still concentrated on rote memorization and assessments that reinforced short, basic answers.

Study results revealed that all treatment and control teacher groups actually

realized losses over the semester in their students' critical thinking abilities as measured through their writing (Appendix item I). Also, losses were evident among both female and male students (Appendix item II), among all student races (item III), across all school settings (Item IV), across all grade levels (item V), across all subjects (item VI), and across all state geographical zones (item VII).

In the pretests, students were coming off summer vacations. Advanced students wrote wonderfully creative stories about inventions. They provided in-depth and lengthy descriptions. On the other hand, many students were unable to even describe an invention. By the end of the semester, the high-end students seemed to have been conditioned and reinforced to provide shorter and less detailed descriptions while the less able students were at least able to basically describe an invention.

My observations in the first year of teachers teaching to the middle were confirmed by these findings. Results seemed to indicate that teachers were able to get lower performing students to rise to at least levels of minimal competency while more advanced students' creativity was not reinforced and their performance regressed, in an exaggerated fashion, to the mean.

It should be noted that the teachers who were identified as the most effective users of the resource did have the least loss in students' measured critical thinking skills and there was statistical significance evident between

them and the blind control group and the less effective users of the resource. But, on the other hand, there were as many control teachers who had actual classwide gains as there were treatment teachers with classwide gains. Only about ten percent of all the classrooms actually realized gains over the semester in classwide student critical thinking skills as measured through their writing abilities.

So, while I had hypothesized that the supplemental resource would cause greater gains among its users, the reality was that the classroom resource, if used effectively, actually reduced classwide losses in students' critical thinking skills. I discovered universal losses in classwide student critical thinking skills over the course of a semester, through student writing samples through this study. If these findings are valid then what can we do in our schools to get to the point to actually see gains in such areas? Since I did witness some of the teachers and classes that did have gains I have some knowledge about what it will take to have students get to the point of actually having universal class wide gains in critical thinking skills. To get to this point it will take a lot of work and a lot of change. Some people rush to conclude that its all about teacher effectiveness. That's too simple an explanation because it has to be more than just about teacher effectiveness if there is merit in providing supplemental resources in schools.

## Conclusions

The arts-based supplemental resource encouraged students to take career risks in the arts and encouraged them to be more creative in their artwork, performances, and writing.

The absence of requirements of use, intensive program teacher training to familiarize teachers with program expectations, and the problems with alignment between the monthly study guide and the intended purposes of the resource impeded the effectiveness of it.

With requirements of use in place coupled with intensive program teacher training and the delivery of grade-appropriate study guide questions designed to match the program's intent of increasing student critical thinking, resource usage could play an integral role in raising classwide critical thinking skills.

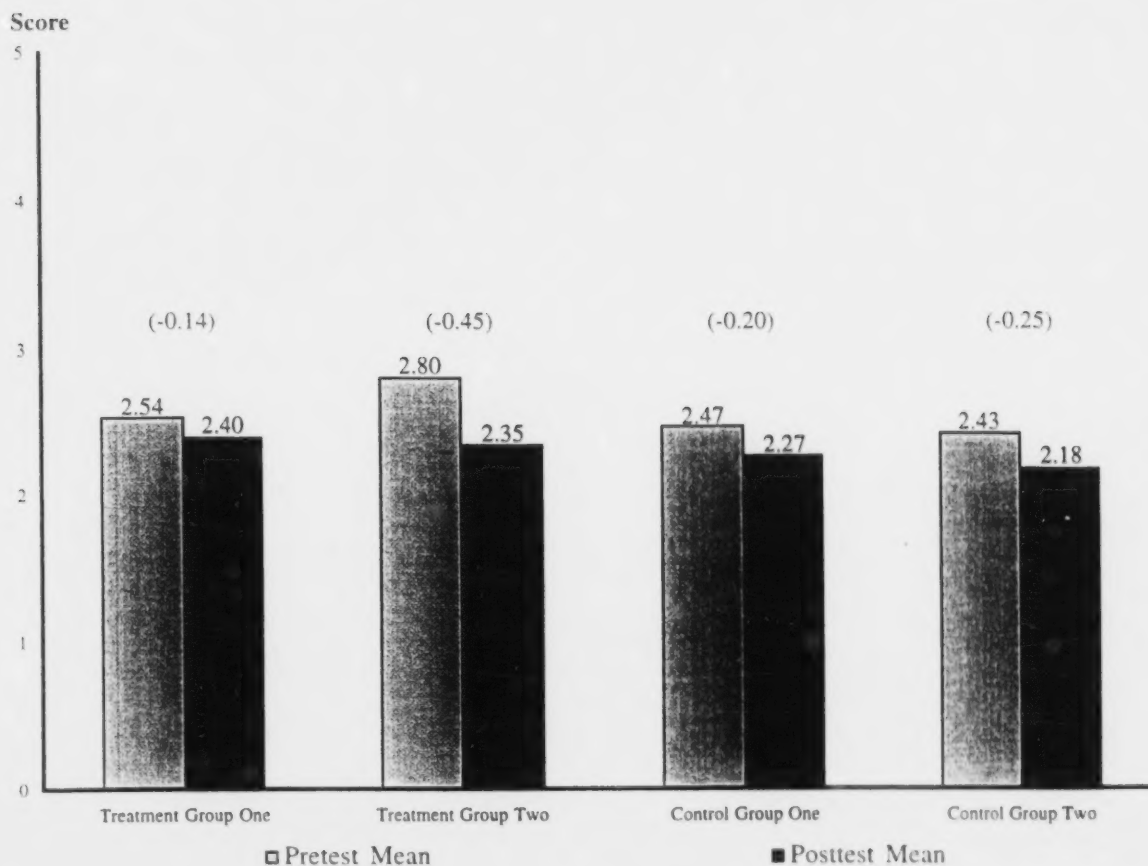
Beyond the study findings, I had the opportunity to witness one person's attempts of basically funding and supporting this statewide educational venture. During the second year of the study the benefactress abruptly resigned and the classroom program, that has relied on soft money, is in jeopardy along with the publication itself. Witnessing the perils of relying on soft money for educational programs has caused me to conclude that state and federal funds need to be in place for such programs. The arts, and other educational resource ventures, should not rely on soft money. Money that is legislated into education is probably more secure than

soft money that can be pulled from programs for a justifiable reason or on a whim. Supplemental resource programs like this one should be funded in such a manner that ensures that the resource has enough time to be evaluated and improved or evaluated and modified or abolished based on its ineffectiveness. If supplemental curriculum programs have merit and worth then they should be funded in such a manner that they can carry on and make a difference in the educational lives of students. It is doubtful that this arts-based program will be in place much longer in Indiana schools and, despite its shortcomings, that could be addressed, and corrected, as a result of this evaluation, this is unfortunate.

## Appendix

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

Table 4.03  
Pretest and Posttest Means  
by Teacher Group



## PRETEST

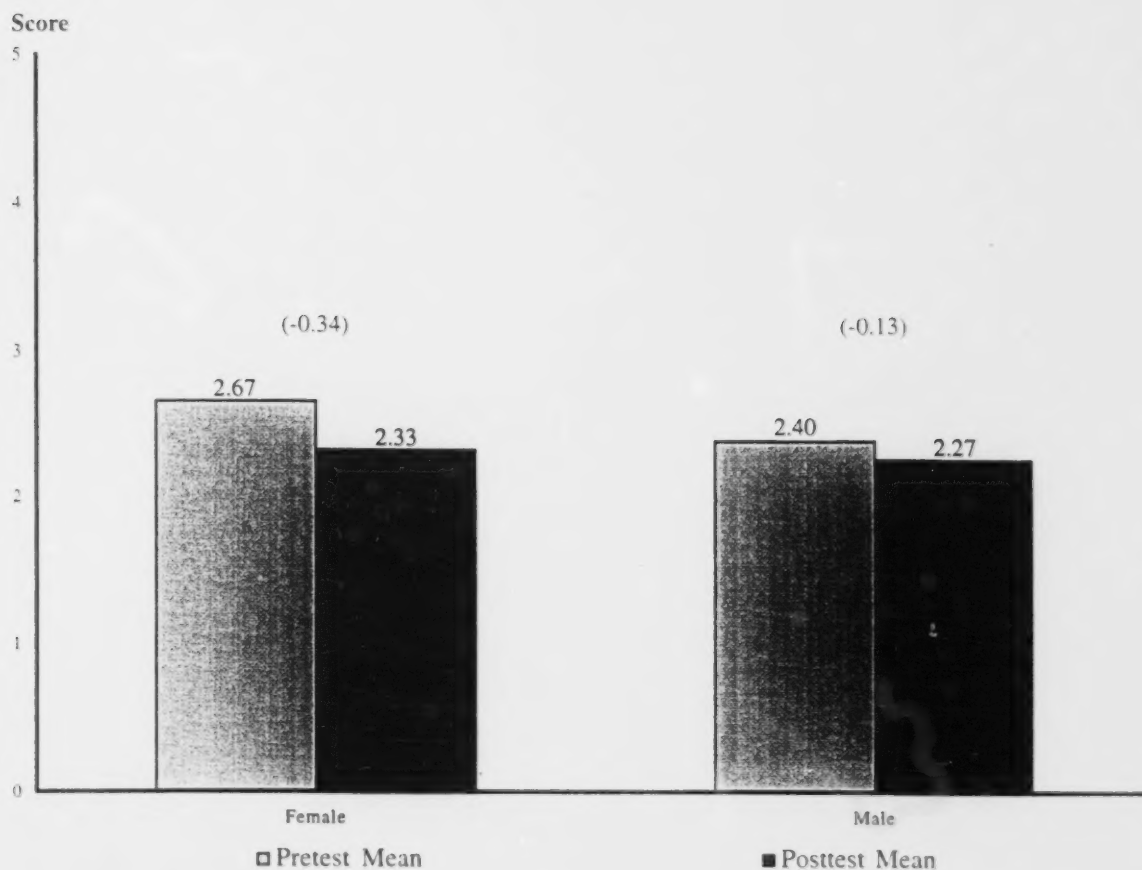
T1 — Std Err .0387, Variance .4248, Std Dev .6518, Range 4.00  
 T2 — Std Err .0444, Variance .4144, Std Dev .6438, Range 5.00  
 C1 — Std Err .0384, Variance .3710, Std Dev .6091, Range 4.00  
 C2 — Std Err .0253, Variance .4297, Std Dev .6556, Range 4.00

## POSTTEST

T1 — Std Err .0392, Variance .4346, Std Dev .6592, Range 4.00  
 T2 — Std Err .0388, Variance .3154, Std Dev .5616, Range 3.00  
 C1 — Std Err .0329, Variance .2711, Std Dev .5206, Range 4.00  
 C2 — Std Err .0198, Variance .2626, Std Dev .5124, Range 3.00

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

**Table 4.05**  
**Pretest and Posttest Means**  
**by Student Gender**



## FEMALE

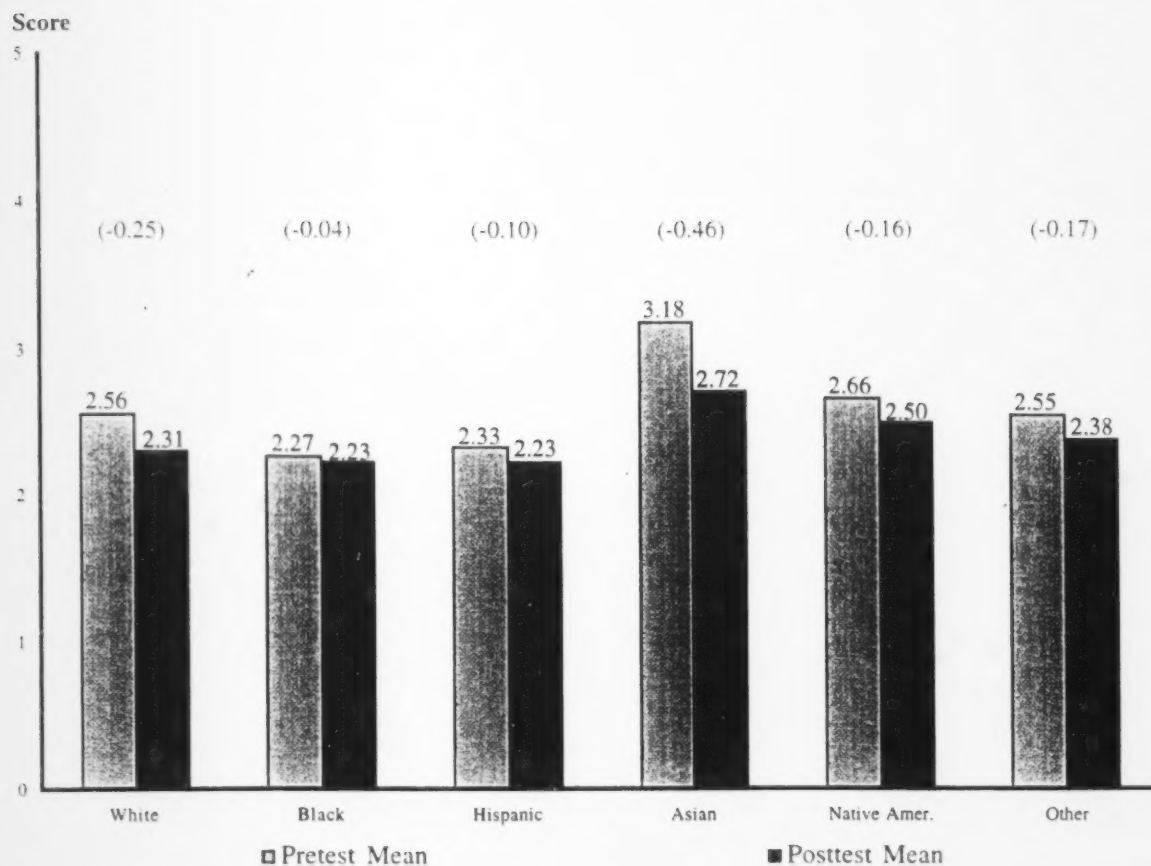
PRETEST: Median 3.00, Std Err .0229, Variance .4033  
Skewness -.6925, S E Skew .0882, Kurtosis 1.66, S E Kurt .17,  
Range 4.00, Std Dev .6351  
POSTTEST: Median 2.00, Std Err .0198, Variance .3000  
Skewness -.2568, S E Skew .0882, Kurtosis .27, S E Kurt .17,  
Range 4.00, Std Dev .5477

## MALE

PRETEST: Median 2.00, Std Err .0252, Variance .4087  
Skewness -.3847, S E Skew .0962, Kurtosis 1.77, S E Kurt .19,  
Range 5.00, Std Dev .6393  
POSTTEST: Median 2.00, Std Err .0226, Variance .3292  
Skewness -.0382, S E Skew .0962, Kurtosis 2.00, S E Kurt .19,  
Range 4.00, Std Dev .5737

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

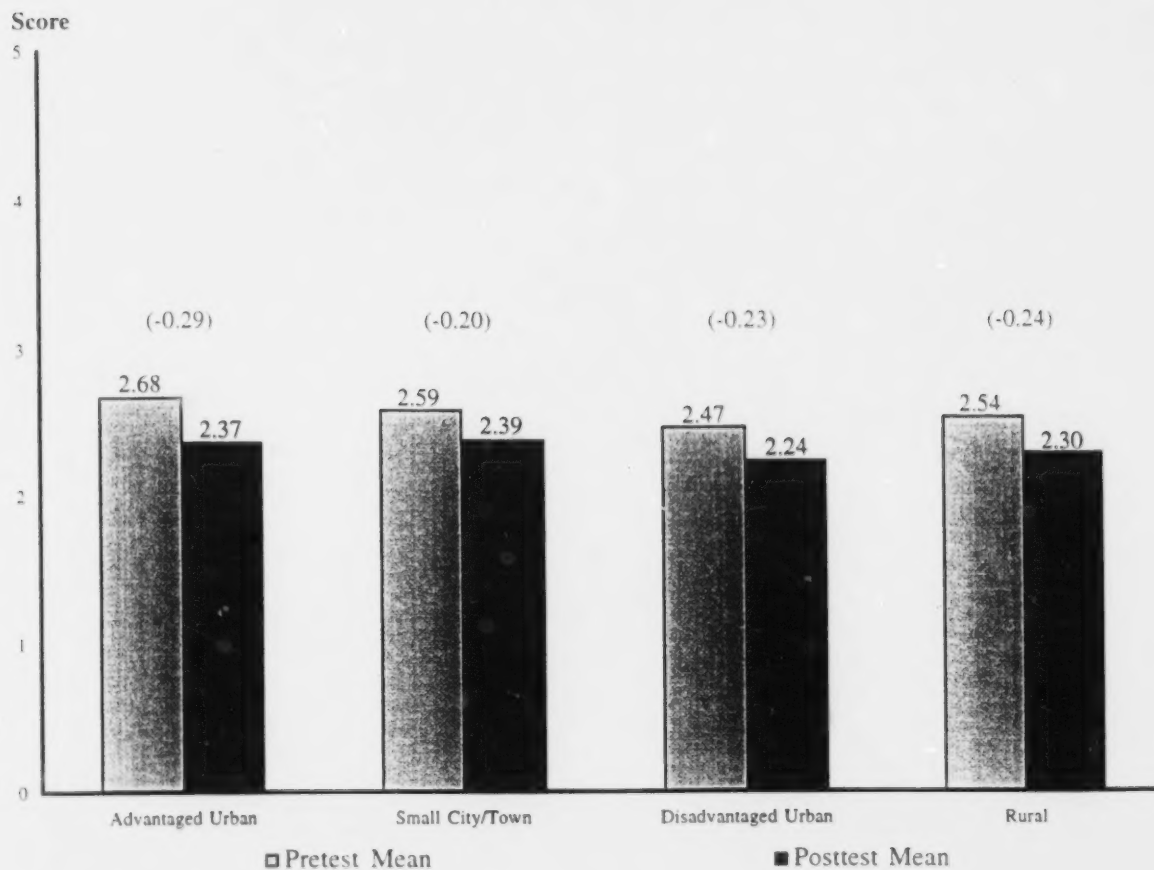
Table 4.06  
Pretest and Posttest Means  
by Student Race



|          | WHITE       | BLACK       | HISPANIC    | ASIAN       | NATIVE AM.  | OTHER       |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
|          | PRE/POST    | PRE/POST    | PRE/POST    | PRE/POST    | PRE/POST    | PRE/POST    |
| Std Dev  | .6505/.5586 | .5667/.5012 | .5258/.5763 | .7508/.7862 | .8165/.8367 | .7048/.6077 |
| Variance | .4231/.3120 | .3212/.2512 | .2764/.3322 | .5636/.6182 | .6667/.7000 | .4967/.3693 |
| Std Err  | .0184/.0158 | .0611/.0540 | .0811/.0889 | .2264/.2371 | .3333/.3416 | .1661/.1432 |
| Range    | 5.00/4.00   | 4.00/3.00   | 2.00/3.00   | 2.00/2.00   | 2.00/2.00   | 3.00/2.00   |

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

**Table 4.07**  
**Pretest and Posttest Means**  
**by School Setting**



## PRETEST

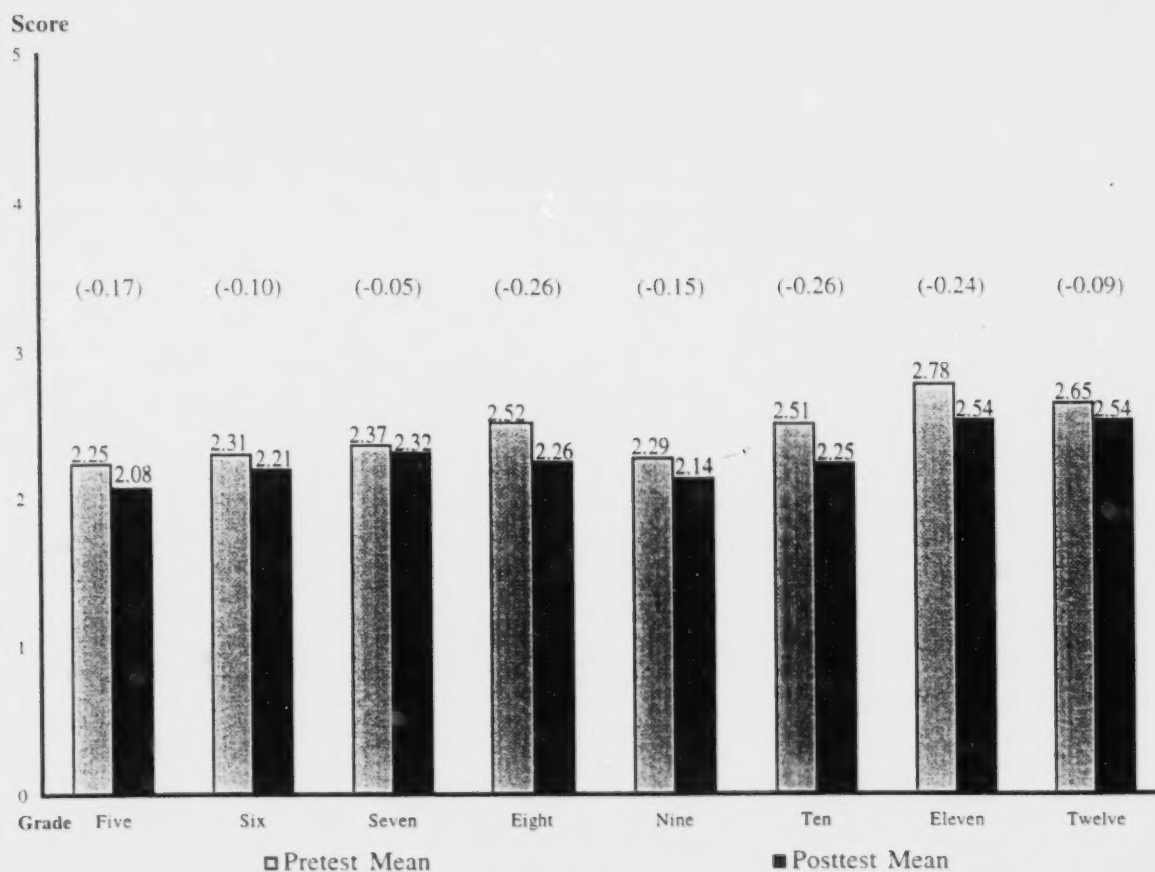
|            |                                                          |
|------------|----------------------------------------------------------|
| Adv. Urban | Std Err .0476, Variance .4627, Std Dev .6802, Range 4.00 |
| Small City | Std Err .0390, Variance .4170, Std Dev .6458, Range 5.00 |
| Dis. Urban | Std Err .0291, Variance .4521, Std Dev .6724, Range 4.00 |
| Rural      | Std Err .0297, Variance .3537, Std Dev .5947, Range 4.00 |

## POSTTEST

|            |                                                          |
|------------|----------------------------------------------------------|
| Adv. Urban | Std Err .0450, Variance .4122, Std Dev .6421, Range 4.00 |
| Small City | Std Err .0330, Variance .2975, Std Dev .5454, Range 4.00 |
| Dis. Urban | Std Err .0229, Variance .2817, Std Dev .5307, Range 4.00 |
| Rural      | Std Err .0278, Variance .3091, Std Dev .5560, Range 4.00 |

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

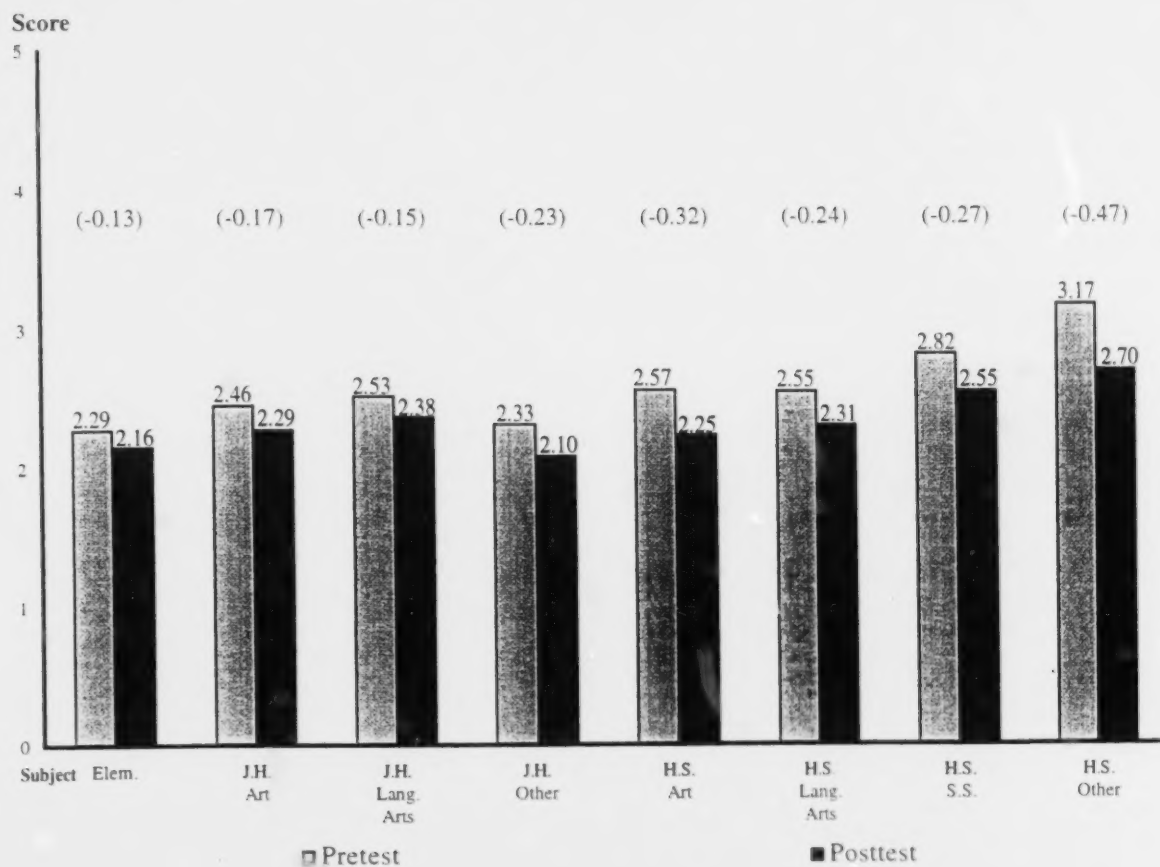
**Table 4.08**  
**Pretest and Posttest Means**  
**by Student Grade Level**



| GRADE           | FIVE  | SIX   | SEVEN | EIGHT | NINE  | TEN   | ELEVEN | TWELVE |
|-----------------|-------|-------|-------|-------|-------|-------|--------|--------|
| <u>PRETEST</u>  |       |       |       |       |       |       |        |        |
| Std Err         | .1085 | .0952 | .0721 | .0551 | .1043 | .0259 | .0599  | .0483  |
| Variance        | .2826 | .3720 | .3068 | .3547 | .2934 | .4539 | .3122  | .4323  |
| Std Dev         | .5316 | .6099 | .5539 | .5956 | .5417 | .6737 | .5588  | .6575  |
| Range           | 2.00  | 3.00  | 3.00  | 4.00  | 2.00  | 4.00  | 2.00   | 4.00   |
| <u>POSTTEST</u> |       |       |       |       |       |       |        |        |
| Std Err         | .0576 | .0654 | .0659 | .0476 | .0697 | .0199 | .0709  | .0479  |
| Variance        | .0797 | .1756 | .2566 | .2654 | .1311 | .2686 | .4373  | .4236  |
| Std Dev         | .2823 | .4149 | .5065 | .5152 | .3620 | .5182 | .6613  | .6509  |
| Range           | 1.00  | 1.00  | 2.00  | 3.00  | 1.00  | 4.00  | 4.00   | 3.00   |

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

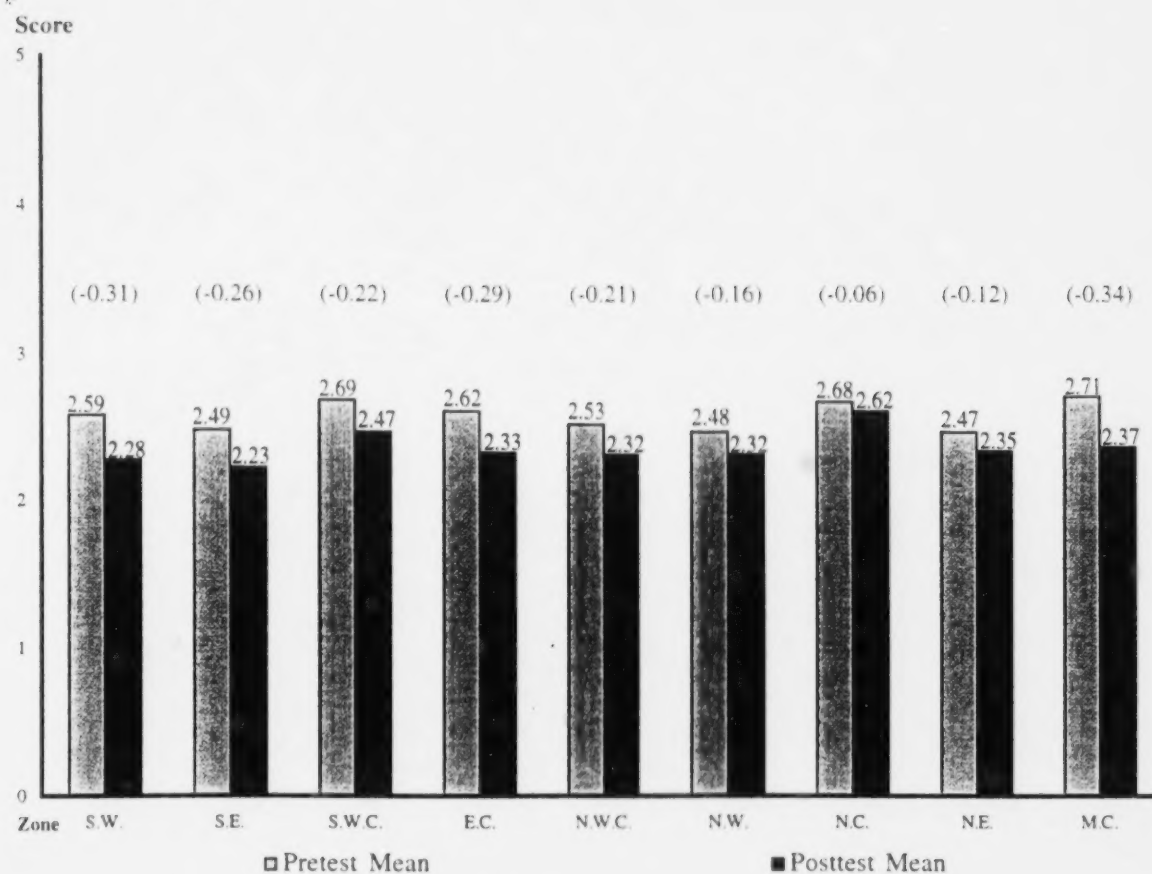
Table 4.09  
Pretest and Posttest Means  
by School Subject



| SUBJECT         | Elem. | J.H. Art | J.H. L. Arts | J.H. Other | H.S. Art | H.S. L. Arts | H.S. S.S. | H.S. Other |
|-----------------|-------|----------|--------------|------------|----------|--------------|-----------|------------|
| <b>PRETEST</b>  |       |          |              |            |          |              |           |            |
| Std Err         | .0950 | .0464    | .1439        | .1060      | .0449    | .0216        | .1181     | .1542      |
| Variance        | .2796 | .3398    | .2692        | .4386      | .3754    | .4349        | .5583     | .4044      |
| Std Dev         | .5287 | .5829    | .5189        | .6623      | .6127    | .6595        | .7472     | .6359      |
| Range           | 2.00  | 4.00     | 1.00         | 4.00       | 3.00     | 4.00         | 4.00      | 3.00       |
| <b>POSTTEST</b> |       |          |              |            |          |              |           |            |
| Std Err         | .0672 | .0407    | .1404        | .0614      | .0421    | .0185        | .1071     | .1664      |
| Variance        | .1398 | .2613    | .2564        | .1471      | .3304    | .3180        | .4590     | .4706      |
| Std Dev         | .3739 | .5111    | .5064        | .3835      | .5748    | .5639        | .6775     | .6860      |
| Range           | 1.00  | 3.00     | 1.00         | 2.00       | 3.00     | 4.00         | 3.00      | 2.00       |

# A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS

Table 4.10  
Pretest and Posttest Means  
by State Zone



|                 | <u>S.W.</u> | <u>S.E.</u> | <u>S.W.C.</u> | <u>E.C.</u> | <u>N.W.C.</u> | <u>N.W.</u> | <u>N.C.</u> | <u>N.E.</u> | <u>M.C.</u> |
|-----------------|-------------|-------------|---------------|-------------|---------------|-------------|-------------|-------------|-------------|
| <u>PRETEST</u>  |             |             |               |             |               |             |             |             |             |
| Std Err         | .0716       | .0267       | .0722         | .0591       | .0693         | .0479       | .0688       | .0592       | .0612       |
| Variance        | .4662       | .4482       | .2189         | .4091       | .3985         | .3653       | .3126       | .3187       | .5140       |
| Std Dev         | .6828       | .6695       | .4679         | .6396       | .6312         | .6044       | .5591       | .5645       | .7169       |
| Range           | 4.00        | 5.00        | 1.00          | 4.00        | 3.00          | 3.00        | 2.00        | 3.00        | 4.00        |
| <u>POSTTEST</u> |             |             |               |             |               |             |             |             |             |
| Std Err         | .0650       | .0205       | .1036         | .0454       | .0545         | .0449       | .0771       | .0571       | .0578       |
| Variance        | .3841       | .2642       | .4506         | .2414       | .2465         | .3205       | .3928       | .2972       | .4578       |
| Std Dev         | .6198       | .5140       | .6713         | .4913       | .4965         | .5661       | .6267       | .5452       | .6766       |
| Range           | 3.00        | 4.00        | 3.00          | 2.00        | 2.00          | 3.00        | 3.00        | 3.00        | 4.00        |

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1992-93 School Administration Certification, Indiana University-Purdue University at Indianapolis  
1990 Journalism Teacher Certification, Ball State University, Muncie, Indiana  
1989-90 Psychology Teacher Certification, Ball State University and Indiana-Purdue Universities at Fort Wayne  
1986-88 U.S. History, Geography, & World Civilization Teacher Certification, Ball State University  
1978-79 Master of Arts degree, Public Relations & Philosophy, Ball State University  
1975-78 Bachelor of Science degree, Journalism & History, Ball State University  
1976 Ball State London Centre, London, England  
1974-75 Liberal Arts, University of Evansville, Evansville, Indiana  
1974 Graduate, Pendleton Heights High School, Pendleton, Indiana  
1971-72 Kentucky Academy, Lyndon, Kentucky

## STUDIES

A STUDY OF CRITICAL THINKING SKILLS AND WRITING ABILITY AMONG INDIANA STUDENTS, Indiana University School of Education, Bloomington, 1997  
QUANTITATIVE ASPECTS OF SUBJECTIVE BEHAVIOR AND SOCIAL ATTITUDES, Ball State University, Muncie, 1979

## EXPERIENCE

- 1993-Present Associate Faculty, School of Teacher Education: Graduate School Instructor, Curriculum and Instruction Development, Undergraduate Instructor, Exploration of Education Courses and Field Experiences, Lilly Grant Recipient for Web-Based/ Distance Ed. Course development and delivery, Supervisor of Student Interns in Math, Chemistry, Language Arts, Civics, U.S. History, Government, French, Physical Education, Health, and Grades 2 through 6th, and NCATE & ICATE Development, University of Indianapolis  
Adjunct Faculty: Graduate School Instructor, K-12 Supervision and Evaluation of Instruction, School Administration Certification Program, Indiana University School of Education, Indianapolis  
University Supervisor of Student Teachers, Language Arts and Journalism, School of Education, Indiana University-Purdue University at Indianapolis  
Research Coordinator/Program Evaluator: *Arts Indiana Magazine in the Classroom*, Indianapolis  
Study Guide Author of *Arts Now!!!*: a monthly supplemental resource for 9,000 Indiana students  
Principal's Advisory Council, North Grove Elementary School, Greenwood  
Investigative Team Leader, IUPUI Public/Private School Study, Indiana University  
School Administrator's Internship, Holy Name School, Beech Grove, Indiana  
1986-92 School Co-Coordinator/Teacher/Counselor, Harmony School, Bloomington, Comprehensive Social Studies and Gifted/Talented Instructor, Bellmont High School, Decatur; Student Government Adviser, Community Service Director, Fine Arts Council President, Project Journey At-Risk Counselor, Class Sponsor, Gifted/Talented K-12 Curriculum Writer  
Student Teacher, Delta High School and Teacher Participant, Yorktown High School  
Teaching Methods Participant, Burris Laboratory School, Ball State University, Muncie  
1980-86 Trainer and Researcher for businesses and social agencies

## PERSONAL HONORS AND AWARDS

Lilly Endowment Grant awarded for creation of web-based graduate curriculum development course  
Special National Award, Community Action Network, for writing *Arts Now !!!* monthly student study guide  
Pi Lambda Theta, Iota Chapter Initiate, International Honor Society and Professional Association in Education  
Exceptional Merit Award, Community Action Network, *Arts Indiana Magazine in the Classroom* Outreach Program  
Who's Who Among America's Educators  
Certificate of Achievement for Curriculum Writing and Development, Indiana Department Of Education  
Certificate of Recognition for Grant Writing, Indiana Council For The Social Studies  
Certificate of Merit, Exemplary Instructor, Indiana Academic All-Stars, Indianapolis Star & News  
President, North Adams Schools Fine Arts Council  
Certificate of Merit, Phi Delta Kappa Educational Fraternity  
Outstanding Young American, United States Jaycees and National Historical Society  
Citizen of the Day, Public Service Commendation, WSCH Radio Public Information Show